

REMARKS

Dependent Claim 2 has been added to this patent application to specifically recite the feature of the invention disclosed at page 2, lines 10 - 12, which states that it is advantageous to make the conical male and female threads of the thread coupling in accordance with the present invention with a cone angle which is smaller than 20 degrees. The advantages of this feature are discussed at page 2 of the specification which states:

"...The male thread 5 and the female thread 4 are conical with constant pitch. It has turned out to be advantageous to make the thread with a cone angle which is smaller than 20°. This means that the pitch angle of the threads increases when the diameter decreases. Through this the largest load on the threads is moved away from the area where known technique has had a tendency to give thread breakage...."

Dependent Claim 3 recites that the cone angle of the male and female threads 5 and 4 is between 2 - 5 degrees, and dependent Claim 4 recites that the cone angle of the male and female threads is 3 degrees. The limitations in dependent Claims 3 - 4 relating to the cone angle of the male thread are encompassed within the original disclosure of this application, which expressly recites that the cone angle of the male thread 5 and female thread 4 is smaller than 20 degrees (page 2, lines 10 - 11 of the original specification).

Claim 1 has also been revised to correct a minor typographical error. Original Claim 1, Line 7 refers to "said female thread (6)". However, the female thread is designated by reference numeral (4) in the specification (page 2, line 1), the drawing (Fig. 1), and at line 2 of original Claim 1. Claim 1 has therefore been revised to consistently designate the female thread by reference numeral (4).

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In the final action dated February 18, 2003, the Examiner maintained the rejection of independent Claim 1 as being obvious over Jansson et al, (U.S. Patent No. 4,760,887) in views of Saunders et al (U.S. Patent No. 4,549,754); as being obvious over Jansson et al in view of Saunders et al and Eklof et al (U.S. Patent No. 4,687,368); as being obvious over Larsson (U.S. Patent No. 4,861,209) in view of Saunders et al; and as being obvious over Larsson in view of Saunders et al and Eklof et al. Applicant respectfully disagrees with the rejection of independent Claim 1 over the references applied in the Official Action dated February 18, 2003.

At the last sentence of page 5 of the Official Action, the Examiner has acknowledged that the applied Jansson, Eklof and Larsson patents do not teach conical threads as disclosed and

claimed by Applicant. The Official Action states that the Examiner has applied the Saunders patent to teach this feature. However, the Official Action fails to address the specific arguments raised in Applicant's Request For Reconsideration filed January 13, 2003, emphasizing the basic differences between percussive and rotary drilling, and why one skilled in the percussive drilling art would not look to the rotary drilling art for guidance.

The first paragraph of page 6 of the Official Action acknowledges that the Saunders patent does not teach a male thread with a radius of curvature larger than thirty percent of the pitch of the thread, as disclosed and claimed by Applicant. The Official Action states that this feature can be found in the Jansson and Larsson patents. However, the rejection based upon a combination of the Saunders and Larsson patents has combined references from the rotary drilling art and the percussive drilling art without addressing the arguments advanced by Applicant emphasizing the differences in the nature of rotary drilling operations and equipment and percussive drilling operations and equipment.

The second paragraph of page 6 of the Official Action states that one cannot establish non-obviousness by attacking references individually where the rejection of the claim is based on a

combination of references. However, Applicant respectfully submits that if it can be shown that the individual references are sufficiently diverse in nature, there can be no suggestion in the art to combine such diverse references.

The third paragraph of page 6 of the Official Action states that "...Applicant has not positively recited any feature in the body of the claim that would indicate that the drill string could only be used for percussive drilling...". Based on this conclusion, the Examiner has failed to give any patentable weight to the recitation of "percussive rock drilling" in the preamble of Applicant's independent Claim 1. Applicant respectfully disagrees with the Examiner's conclusion. The recitations in the body of the claim, including "a first impact surface", "a second impact surface", and "said first and second impact surfaces being arranged to abut against each other" are recitations which can be reasonably interpreted as being directed only to percussive drilling since first and second impact surfaces and an arrangement of first and second impact surfaces to abut against each other, are relevant only to percussive drilling. Therefore, since positive structural features recited in the body of independent Claim 1 are relevant only to percussive drilling, the recitation of "thread coupling for a drill string for percussive rock drilling..." in the preamble of the claim is entitled to patentable consideration because 1). it is necessary for a

complete understanding of the entire claim, and 2). it breathes life and meaning into the overall claim. Applicant again relies upon the arguments and authorities cited at pages 8 - 9 of the Request For Reconsideration filed on January 13, 2003, and submits that the preamble of independent Claim 1 is entitled to full consideration in determining the patentability of the claim.

The last paragraph of page 6 of the Official Action states that Applicant has argued that rotary drilling and percussive drilling are non-analogous arts. Applicant respectfully disagrees. The arguments presented in Applicant's prior response were that as of the result of the differences in the basic nature of rotary and percussive drilling, features of rotary drilling devices are not interchangeable with features of percussive drilling devices.

The first paragraph of page 7 of the Official Action states that "...The mere fact that Saunders is used for rotary drill[ing] does not indicate that the reference is not analogous art." However, because Saunders is used for rotary drilling and not percussive drilling, Applicant submits that a person skilled in the percussive drilling art is not likely to look to Saunders for guidance as a result of the differences in the nature of the respective types of drilling. There is no evidence of record establishing that a person of ordinary skill in the relevant art

would be likely to modify percussive drilling devices with features found in the rotary drilling art, or that percussive drilling operations and equipment are interchangeable with rotary drilling operations and equipment.

The second paragraph of page 7 of the Official Action states: "...the motivation to combine the references can be found in column 1, lines 63 - 66 of Saunders...". However, Column 1, lines 63 - 66 of Saunders states:

"Another object of this invention is to provide an improved tool joint having a tapered pin with a relieved thread root which results in lower local stresses and reduced susceptibility to fatigue failure."

Applicant respectfully submits that there is nothing at column 1, lines 63 - 66 which provides any motivation whatsoever to combine the references applied in the outstanding Official Action.

The second paragraph of page 7 of the Official Action also states: "Further, rotary drilling and percussive drilling, though different, are not so different that features of one could not be used on the other." However, there is no evidence of record supporting this statement, which appears to be purely conclusory in nature.

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Applicant respectfully submits that all pending claims are allowable over the prior art of record applied in the final action, and favorable action is respectfully requested.

Enclosed please find an Attorney's Change of Correspondence Address. Please forward all further correspondence in connection with this patent application to the new correspondence address.

Also enclosed is a Petition for a one month extension of time to respond to the final action through and including June 18, 2003, together with the required fee for the requested extension.

Respectfully submitted,



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REVISED CLAIM 1

Claim 1. (amended) Thread coupling for a drill string for percussive rock drilling comprising a male thread (5) and a female thread (4) cooperating therewith, said male thread being arranged on a first drill string element (3) and said female thread being arranged on a second drill string element (2), that said first drill string element (3) has a first impact surface (6) and that said second drill string element (2) has a second impact surface (7), said first and second impact surfaces being arranged to abut against each other, characterized in that said male thread (5) and said female thread [(6)] (4) are conical and that the crests (8) of said male thread (5) have a radius of curvature which is larger than 30% of the pitch of the thread.